

WEATHER FORECASTING IN THE UNITED STATES.¹

The above is the title of a volume which has long been desired by American students of the weather. Although weather forecasts have been made in the United States since 1854 when Joseph Henry began to collect daily telegraphic reports at the Smithsonian Institution, there is but little in writing to explain the details of the processes by which daily weather forecasts are made to-day. Much of the experience of our forecasters has remained locked within their own bosoms, and death has destroyed forever much valuable knowledge and experience needed by the science and art.

Realizing the need for a written record of such experience and knowledge in this line as the Weather Bureau possesses, the present Chief of Bureau called upon the staff of forecasters in November, 1913, to submit illustrated essays on forecasting in those fields familiar to each.

These essays were taken in hand by a board appointed in August, 1914, that has worked them over under the leadership of its chairman, Prof. A. J. Henry, into a volume which is meant to aid the beginner in the art as well as to record the rules and considerations found useful by the experienced forecasters of this bureau.

Two preliminary chapters open the work: Chapter I, dealing with the problems of atmospheric motions, particularly as influenced by the earth's rotation, is by C. F. Marvin; Chapter II, by W. J. Humphreys, deals in a general way with the general circulation of the atmosphere and presents, by implication, a new classification of the winds, at the same time offering some new definitions of old classes.

The relation of atmospheric pressure distribution and of certain well-known barometric configurations to subsequent weather is discussed by A. J. Henry in chapters III, IV, and V. Chapter IV, on auxiliary pressure-change charts, will be particularly interesting to European meteorologists since it is perhaps the first printed exposition of American experience with these charts, although the Weather Bureau began to construct and use them as early as 1872.

The well-marked weather phenomena, such as cold waves, frosts, high winds, fog, snow, sleet (Eiskörner), ice storms (glaze or Glatteis), and thunderstorms, are discussed chiefly by H. J. Cox, H. C. Frankenfield, and E. H. Bowie. The peculiarities of the routine forecasting work for each of the six forecast districts are discussed in Chapters X, XI, XII, by the respective District Forecasters in charge; and the text closes with Chapter XIII on long-range forecasts by District Forecaster E. H. Bowie, who presents the guiding precepts underlying the safe, conservative weekly forecasts now issued by the bureau.

The work is generously illustrated by small-scale maps and diagrams, many of them in two colors, to the number of 200; it also has a short glossary of terms used in this work, a selected list of works in English on forecasting, and an index.

The editor, Prof. A. J. Henry, states in his preface:

The book will be a disappointment to those, if there be such, who have formed the expectation that it will solve the difficulties of the forecasting problem. The consensus of opinion seems to be that the only road to successful forecasting lies in the patient and consistent study of the daily weather maps. Wherein the book will be helpful, however, is in the fact that it gives the experience of those who have gone before, and it is in this sense that it will find its most useful application.—C. A., jr.

THE PERSISTENCE OF WET AND DRY WEATHER.¹

By E. V. NEWNHAM, B. Sc., F. R. Met. Soc.

[Abstract.]

In this paper an attempt is made to analyze the rainfall records of several British stations with the help of modern statistical methods in order to find out to what extent the tendency for wet and fine (fair) days to occur in "runs" can assist in forecasting rain in the near future.

It can be shown that the rainfall of one day is not independent of that of the next. For example, by the law of chance 41 runs of 6 "rain days" should be expected at Kew in 10 years and the chances are rather against a run of 12 days occurring at all; actually there were 181 runs of 6 and 12 runs of 12 successive "rain days."

An examination of the records shows that the chance of any given day being a "rain day" is increased somewhat beyond the normal by the fact of the preceding day having been wet. The records of Aberdeen, Kew, and Valencia for 1901-1910 and of Greenwich for 1887-1913 have been examined in detail. The results show that the chance of the succeeding day being a "rain day" increases with the length of the run. It does not appear to have reached a constant value after a spell of nine successive "rain days" but is still rising slowly. The observations in these regions are, however, too few to warrant any conclusions being drawn as to the precise form of the curve here.

The author concludes that during a long spell of wet weather there are no grounds for expecting finer conditions merely because the unsettled weather has lasted so long; and similarly that during fine weather the chances of continued drought become greater the longer the fine weather lasts, at any rate for spells of a length commonly met with. What happens when the length of the spell reaches a quite abnormal value must remain doubtful, but it seems reasonable to suppose the probability reaches a constant value.—W. G. Reed.

NEW SOUTH WALES RAINFALL.²

By D. J. MARES.

[Commonwealth Bureau of Meteorology, Melbourne.]

SOME PECULIARITIES IN THE ANNUAL DISTRIBUTION.

The average annual isohyetal chart of New South Wales brings out prominently the four main rainfall regions, viz, the Great Plains, the Mountain Slopes, the Tablelands, and the Eastern Areas. Studying the chart from west to east, it is evident that a considerable area comprising the Great Plains and the Tablelands, receives annual totals which vary almost in proportion to the altitude. The rainfall of a country is of course affected by the proximity to the sea as well as elevation; but, notwithstanding the rainfall of New South Wales west of the mountains is largely controlled by elevation, a very small percentage of western rain crosses the highlands to the coast and coastal rains rarely penetrate to the western districts except through the Cassilis geocol. In general, the altitudes of stations on the great western plains are

¹ Published in Quarterly Journal of the Royal Meteorological Society, London, July, 1916, 42: 153-162.

² Reprinted from pp. 20-21 of "Results of rainfall observations made in New South Wales during 1909-1914, . . . by H. A. Hunt, Commonwealth Meteorologist," Melbourne, 1916. 224p. plates. 29cm. (Australia. Commonwealth Bureau of Meteorology.)

The sketch map of physiographic districts of New South Wales (fig. 1) has been prepared by the Editor from the annual Rain Map of Australia.

¹ United States. Weather Bureau. Weather forecasting in the United States. By a board composed of Alfred J. Henry, chairman, Edward H. Bowie, Henry J. Cox, Harry C. Frankenfield. Washington, 1916. 370 p. 199 figs. fr. p. 4". (Weather Bureau number 583.) Price, \$0.35.